DISPLAY APPARATUS

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority from Korean Patent Application No. 10-2015-0107189, filed on Jul. 29, 2015 in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference in its entirety.

BACKGROUND

[0002] 1. Field

[0003] Apparatuses and methods consistent with exemplary embodiments relate to a display apparatus and a method for improving cross-talk.

[0004] 2. Description of the Related Art

[0005] A display apparatus is used to display visual information. Examples of the display apparatus are a Liquid Crystal Display (LCD) device, an ElectroLuminescence Display (ELD) device, a Field Emission Display (FED) device, a Plasma Display Panel (PDP) device, a Thin Film Transistor-Liquid Crystal Display (TFT-LCD) device, and a flexible display device.

[0006] Such a display device is used as a television (TV), a monitor of a computer, or a monitor of a laptop computer. Also, the display device is used as display units of various electronic devices, such as a display unit of a mobile terminal, a display unit of a refrigerator, and a display unit of a camera.

[0007] Recently, a display device capable of displaying three-dimensional (3D) images as well as two-dimensional (2D) images has been developed.

[0008] A general method of implementing 3D images is to use a viewer's binocular disparity.

[0009] A method of implementing 3D images using binocular disparity can be classified into a stereoscopic method and an autostereoscopic method.

[0010] The stereoscopic method requires a user to wear 3D glasses, such as polarizing glasses and LC shutter glasses.

[0011] The autostereoscopic method enables a user to view 3D images with naked eyes by using a lenticular lens, parallax barriers, parallax illumination, etc.

[0012] The autostereoscopic method is applied to a display for games, a home TV, a display for exhibition, etc.

[0013] In the autostereoscopic method, a method using parallax barriers is to implement 3D images by causing light scattered by patterns arranged at regular intervals in a light guide plate (LGP) to be transmitted through a display panel.

SUMMARY

[0014] One or more exemplary embodiments provide a display apparatus including a polarizing panel for preventing leakage light of a second backlight unit from being incident to the second backlight unit when the second backlight unit is driven in order to display a 3D image.

[0015] According to an aspect of an exemplary embodiment, there is provided a display apparatus including: a backlight assembly configured to emit light; and a display panel configured to display a two-dimensional (2D) image or a three-dimensional (3D) image using the light, wherein the backlight assembly includes: a first backlight unit configured to emit light for creating the 2D image; a second backlight unit configured to emit light for creating the 3D image; and a first polarizing panel disposed between the first backlight unit and the second backlight unit, and configured to prevent at least a portion of leakage light leaking from the second backlight unit from being incident to the second backlight unit.

[0016] The first polarizing panel may be configured to emit only a portion of the leakage light that is incident to the first polarizing panel, and emit only a portion recycled light that is emitted from the first backlight unit and is incident to the first polarizing panel, the recycled light being emitted from the first backlight unit by recycling the portion of the leakage light that is emitted by the first polarizing panel and incident to the first backlight unit.

[0017] The display panel may include a liquid crystal panel, and a second polarizing panel disposed between the liquid crystal panel and the second backlight unit, and the first polarizing panel and the second polarizing panel have a same polarizing axis.

[0018] The first backlight unit may include a first light guide plate, and a first light source unit disposed along a lateral side of the first light guide plate.

[0019] The first backlight unit may include a first light source unit, and a diffusion plate disposed in front of the first light source unit, and configured to diffuse light emitted from the first light source unit.

[0020] The second backlight unit may include: a second light guide plate; a second light source unit disposed along a lateral side of the second light guide plate, and configured to emit light to the second light guide plate; and a plurality of barriers arranged at regular intervals in the second light guide plate, and configured to reflect and scatter incident light.

[0021] The second light guide plate may be configured to totally reflects light emitted from the second light source unit, and emit light scattered and reflected by the barriers to outside of the second light guide plate.

[0022] The second backlight unit and the first polarizing panel may be configured to transmit light emitted from the first backlight unit.

[0023] The backlight polarizing panel may be an absorptive polarizing panel.

[0024] The backlight polarizing panel may be a reflective polarizing panel.

[0025] According to an aspect of another exemplary embodiment, there is provided display apparatus including: a display panel configured to display a two-dimensional (2D) image or a three-dimensional (3D) image; a first backlight unit configured to emit light for creating the 2D image; a second backlight unit disposed between the display panel and the first backlight unit, and configured to emit light for creating the 3D image; and a first polarizing panel disposed between the first backlight unit and the second backlight unit, and configured to, when the second backlight unit is operating, pass only a portion leakage light that leaks from the second backlight unit and incident to the first polarizing panel, and pass only a portion of recycled light that is emitted from the first backlight unit and is incident to the first polarizing panel, the recycled light being emitted from the first backlight unit by recycling the portion of the leakage light that is emitted by the first polarizing panel and incident to the first backlight unit, and when the first backlight unit is operating, transmit light that is emitted from the first backlight unit and is incident to the first polarizing panel.